

What is claimed is:

1. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence from which a sequence having a length of from about 3500 nucleotides to about 4000 nucleotides can be amplified by PCR utilizing an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 57 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 60 as primers, or PCR utilizing the oligonucleotide having the nucleotide sequence shown in SEQ ID NO: 57 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 61 as primers.
2. The virus gene according to claim 1 having a nucleotide sequence from which a sequence having a length of from about 3600 nucleotides to about 3900 nucleotides can be amplified by the PCR.
3. The virus gene according to claim 1 or 2 wherein nucleotide sequences at 5' end and 3' end of a fragment amplified by the PCR have 70% or more of homology to a nucleotide sequence of nucleotide number 3-300 and a nucleotide sequence of nucleotide number 2402-3739 of a nucleotide sequence shown in SEQ ID NO: 1, respectively.
4. The virus gene according to claim 3 wherein the homology is 80% or more.
5. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence from which a sequence having a length of from about 200 nucleotides to about 350 nucleotides can be amplified by PCR utilizing an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 6 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 8 as primers.
6. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence from which a sequence having a length of from about 200 nucleotides to about 350 nucleotides can be amplified by PCR utilizing an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 7 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 8 as primers.
7. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence shown in SEQ ID NO: 1 or an allogeneic variant gene thereof.
8. The virus gene according to any one of claims 5-7 having a nucleotide sequence selected from the group consisting of a nucleotide sequence shown in SEQ ID NO: 45, a nucleotide sequence shown in SEQ ID NO: 46, a nucleotide sequence shown in SEQ ID NO: 47, a nucleotide sequence shown

in SEQ ID NO: 48, a nucleotide sequence shown in SEQ ID NO: 49, a nucleotide sequence shown in SEQ ID NO: 50, a nucleotide sequence shown in SEQ ID NO: 51, a nucleotide sequence shown in SEQ ID NO: 52, a nucleotide sequence shown in SEQ ID NO: 53, and a nucleotide sequence shown in SEQ ID NO: 54.

9. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence shown in SEQ ID NO: 1.

10. A polynucleotide having a nucleotide sequence complementary to a nucleotide sequence of the gene as defined in any one of claims 1-9.

11. An oligonucleotide comprising a nucleotide sequence recognized in the gene as defined in any one of claims 1-9 and specific for the gene or a nucleotide sequence complementary thereto.

12. The oligonucleotide according to claim 11 having a nucleotide sequence selected from the group consisting of a nucleotide sequence shown in SEQ ID NO: 2, a nucleotide sequence shown in SEQ ID NO: 3, a nucleotide sequence shown in SEQ ID NO: 4, a nucleotide sequence shown in SEQ ID NO: 5, a nucleotide sequence shown in SEQ ID NO: 6, a nucleotide sequence shown in SEQ ID NO: 7, and a nucleotide sequence shown in SEQ ID NO: 8.

13. A method for detecting a non-B, non-C, non-G hepatitis virus gene wherein PCR is performed by using the oligonucleotides as defined in claim 11 as primers.

14. A method for detecting a non-B, non-C, non-G hepatitis virus gene wherein PCR is performed by using an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 2 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 3, or an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 4 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 5 as primers.

15. A method for detecting a non-B, non-C, non-G hepatitis virus gene wherein PCR is performed by using an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 6 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 8, or an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 7 and the oligonucleotide having the nucleotide sequence shown in SEQ ID NO: 8 as primers.

16. A method for differentiating non-B, non-C, non-G hepatitis virus genotypes wherein both of the methods as defined in claims 14 and 15 are performed for one sample, and results obtained from the both methods are compared.

17. A method for differentiating non-B, non-C, non-G hepatitis virus genotypes wherein hybridization is performed by using an oligonucleotide present in the gene as defined in claim 8 and specific for genotype of the gene.
18. A polypeptide having an amino acid sequence encoded within an opening reading frame recognized in a nucleotide sequence of the gene as defined in any one of claim 1-9.
19. The polypeptide according to claim 18 having an amino acid sequence encoded by an open reading frame recognized in a nucleotide sequence shown in SEQ ID NO: 1.
20. The polypeptide according to claim 18 having an amino acid sequence shown in SEQ ID NO: 9.
21. The polypeptide according to claim 18 having an amino acid sequence shown in SEQ ID NO: 10.
22. A polypeptide comprising an amino acid sequence which is recognized in an amino acid sequence of SEQ ID NO: 9 or 10 and specific for a non-B, non-C, non-G hepatitis virus.
23. The polypeptide according to claim 18 which contains an epitope specific for a non-B, non-C, non-G hepatitis virus.
24. A method for isolating non-B, non-C, non-G hepatitis virus particles wherein the non-B, non-C, non-G hepatitis virus particles are isolated based on density of the particles.
25. Virus particles isolated by the method as defined in claim 24.
26. A non-B, non-C, non-G hepatitis virus peptide obtained from the virus particles as defined in claim 25.
27. A recombinant gene expression vector which comprises all or a part of a nucleotide sequence encoding an amino acid sequence shown in SEQ ID NO: 9 or 10.
28. A transformant cell containing all or a part of a nucleotide sequence encoding an amino acid sequence shown in SEQ ID NO: 9 or 10.
29. A non-B, non-C, non-G hepatitis virus antigen peptide or a fragment thereof expressed by the transformant cell as defined in claim 28.
30. A method for producing a non-B, non-C, non-G hepatitis virus antigen peptide, which comprises culturing the transformant cell as defined in claim 28 under a condition that the non-B, non-C, non-G hepatitis virus antigen peptide is expressed, and collecting the expressed peptide.
31. A method for immunologically detecting a non-B, non-C, non-G

hepatitis virus antibody using the polypeptide as defined in any one of claims 18-23 and 26 or the virus particles as defined in claim 25 as an antigen.

32. A method for producing an antibody against a non-B, non-C, non-G hepatitis virus, which comprises immunizing an animal with the polypeptide as defined in any one of claims 18-23 and 26 or the virus particles as defined in claim 25 as an immunogen.

33. An antibody obtainable by the method as defined in claim 32.

34. A method for immunologically detecting a non-B, non-C, non-G hepatitis virus antigen by using the antibody as defined in claim 33.

35. A vaccine containing a polypeptide having an amino acid sequence contained in an amino acid sequence encoded by an opening reading frame present in a nucleotide sequence shown in SEQ ID NO: 1, and containing an epitope sequence of a non-B, non-C, non-G hepatitis virus neutralizing antibody.

36. A vaccine containing the virus particles as defined in claim 25.

37. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence shown in SEQ ID NO: 62 or an allogeneic variant gene thereof.

38. A non-B, non-C, non-G hepatitis virus gene having a nucleotide sequence shown in SEQ ID NO: 62.

39. A polynucleotide having a nucleotide sequence complementary to a nucleotide sequence of the gene as defined in claim 37 or 38.

40. An oligonucleotide comprising a nucleotide sequence recognized in a nucleotide sequence of the gene as defined in claim 37 or 38 and specific for the gene, or a nucleotide sequence complementary thereto.

41. The oligonucleotide according to claim 40 having a nucleotide sequence selected from the group consisting of a nucleotide sequence shown in SEQ ID NO: 57, a nucleotide sequence shown in SEQ ID NO: 60, and a nucleotide sequence shown in SEQ ID NO: 61.

42. A method for detecting a non-B, non-C, non-G hepatitis virus gene wherein PCR is performed by using the oligonucleotides as defined in claim 41 as primers.

43. A method for detecting a non-B, non-C, non-G hepatitis virus gene wherein PCR is performed by using an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 57 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 60, or an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 57 and an oligonucleotide having a nucleotide sequence shown in SEQ ID NO: 61 as primers.

44. A polypeptide having an amino acid sequence encoded in an opening reading frame recognized in a nucleotide sequence of the gene as defined in claim 37 or 38.
45. The polypeptide according to claim 44 having an amino acid sequence encoded by an open reading frame recognized in a nucleotide sequence shown in SEQ ID NO: 62.
46. The polypeptide according to claim 44 having an amino acid sequence shown in SEQ ID NO: 63.
47. The polypeptide according to claim 44 having an amino acid sequence shown in SEQ ID NO: 64.
48. A polypeptide comprising an amino acid sequence which is recognized in an amino acid sequence of SEQ ID NO: 63 or 64 and specific for a non-B, non-C, non-G hepatitis virus.
49. The polypeptide according to claim 44 which contains an epitope specific for a non-B, non-C, non-G hepatitis virus.
50. A recombinant gene expression vector which comprises all or a part of a nucleotide sequence encoding an amino acid sequence shown in SEQ ID NO: 63 or 64.
51. A transformant cell containing all or a part of a nucleotide sequence encoding an amino acid sequence shown in SEQ ID NO: 63 or 64.
52. A non-B, non-C, non-G hepatitis virus antigen peptide or a fragment thereof expressed by the transformant cell as defined in claim 51.
53. A method for producing a non-B, non-C, non-G hepatitis virus antigen peptide, which comprises culturing the transformant cell as defined in claim 51 under a condition that the non-B, non-C, non-G hepatitis virus antigen peptide is expressed, and collecting the expressed peptide.
54. A method for immunologically detecting a non-B, non-C, non-G hepatitis virus antibody using the polypeptide as defined in any one of claims 44-49 as an antigen.
55. A method for producing an antibody against a non-B, non-C, non-G hepatitis virus, which comprises immunizing an animal with the polypeptide as defined in any one of claims 44-49 as an immunogen.
56. An antibody obtainable by the method as defined in claim 55.
57. A method for immunologically detecting a non-B, non-C, non-G hepatitis virus antigen using the antibody as defined in claim 56.
58. A vaccine containing a polypeptide having an amino acid sequence contained in an amino acid sequence encoded by an opening reading frame

present in a nucleotide sequence shown in SEQ ID NO: 62, and containing an epitope sequence of a non-B, non-C, non-G hepatitis virus neutralizing antibody.